

Patent Office

1 1. An eyesafe, Q-switched, laser system for target
2 identification, ranging, and gated viewing, said laser system
3 having a number of diodes for optical pumping, comprising: a
4 resonant pumped erbium (RPE) laser having a storage lifetime
5 that minimizes said number of diodes needed to pump said Er
6 laser, said RPE laser being in band to I² devices.

1 2. The eyesafe, Q-switched laser system in accordance
2 with claim 1, further comprising dilute concentrations of
3 unsensitized Erbium in an approximate range between 0.1 and 2%
4 of active ion, and having a lifetime of ~10msec for a 1.5
5 micron transition.

1 3. The eyesafe, Q-switched laser in accordance with
2 claim 2, further comprising an Erbium crystalline or glass
3 host pumped by 1.5 micron diodes or diode pumped Yb-Er glass
4 lasers.

1 4. The eyesafe, Q-switched laser system in accordance
2 with claim 1, further comprising an energy/pulse between ~250
3 and 300mJ.

1 5. The eyesafe, Q-switched laser system in accordance
2 with claim 1, wherein said Erbium laser further comprises a
3 wavelength of ~1.5 microns.

1 6. The eyesafe, Q-switched laser system in accordance
2 with claim 2, wherein said number of diodes pump ~30 to 60W at
3 1.5 microns wavelength for ~10ms.

1 7. An eyesafe, Q-switched, laser system or gain medium
2 for target identification, ranging, gated viewing, and for
3 amplifying fiber communications links, said laser comprising:
4 a resonant pumped erbium (RPE) laser having a storage lifetime
5 that minimizes said number of diodes needed to pump said
6 optical parametric oscillators, said RPE laser being in band I²
7 devices, and that permits the attainment of gain coefficients
8 of 0.5-1cm⁻¹.

1 8. The eyesafe, Q-switched laser system or gain medium
2 in accordance with claim 7, further comprising dilute
3 concentrations of unsensitized erbium in a range of ~0.1 and
4 2% of active ion, and having a lifetime of ~10 msec for a 1.5
5 micron transition.

1 9. The eyesafe, Q-switched laser system or gain medium
2 in accordance with claim 8, further comprising an erbium
3 crystalline or glass host material pumped by 1.5 micron diodes
4 or Yb-Er glass laser.

FOOTNOTES

1 10. The eyesafe, Q-switched laser system or gain medium
2 in accordance with claim 7, further comprising an energy/pulse
3 between ~250 and 300mJ and a gain coefficient from 0.51 cm -
4 1cm^{-1} .

1 11. The eyesafe, Q-switched laser system or gain medium
2 in accordance with claim 8, wherein said erbium lasers further
3 comprise a wavelength of ~1.5 microns.

1 12. The eyesafe, Q-switched laser system or gain medium
2 in accordance with claim 8, wherein said diodes pump ~30 to
3 60W at 1.5 micron wavelength for ~10ms.

1 13. An eyesafe, Q-switched, laser system or gain medium
2 for target identification, ranging, and gated viewing, said
3 laser system having a diode array pump source, comprising: a
4 plurality of diodes needed to achieve high energy storage and
5 high gain.

1 14. A gain medium suitable for amplifying the output of
2 Er fiber lasers to achieve sufficient power for reliable free
3 space communications links, comprising: a resonant.pumped
4 erbium laser having a storage lifetime sufficient to achieve
5 high gain.

1

1 15. The gain medium in accordance with claim 14, further
2 comprising dilute concentrations of unsensitized Erbium in an
3 approximate range between 0.1 and 2% of active ion, and having
4 a lifetime of ~10msec for a 1.5 micron transition.

1 16. The gain medium in accordance with claim 14, further
2 comprising an Erbium crystalline or glass host pumped by 1.5
3 micron diodes or diode pumped Yb-Er glass lasers.

1 17. The gain medium in accordance with claim 14, wherein
2 said Erbium laser further comprises a wavelength of ~1.5
3 microns.